

REPORT DOCUMENTATION PAGE

AD-A256 009



Instructions,
n. Send
burden, to
Arlington, VA

Public reporting burden of this collection of information is estimated to be a searching existing data sources, gathering and maintaining the data needed to complete the review of this collection of information, including the Washington Headquarters Services, Directorate for Information Operations and Reports, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 10/92	3. REPORT TYPE AND DATES COVERED POP Test (09/92)	
4. TITLE AND SUBTITLE Performance Oriented Packaging Testing of Container, Shipping and Storage for the Mk 14 Mod 0 Explosive Section for Packing Group II Solid Hazardous Materials		5. FUNDING NUMBERS DTIC ELECTE S OCT 7 1992 D	
6. AUTHOR(S) Dennis M. Kotun		8. PERFORMING ORGANIZATION REPORT NUMBER DODPOPHM/USA/DOD/NADTR92026	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Weapons Station Earle Test and Evaluation Branch (Code 5023) Colts Neck, NJ 07722-5000		10. SPONSORING/MONITORING AGENCY REPORT NUMBER Same as above	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Officer-in-Charge Naval Mine Warfare Engineering Activity Port Hueneme Division Naval Surface Warfare Center (Code 7310, J. Foster) Yorktown, VA 23691-5076		11. SUPPLEMENTARY NOTES N/A	
12a. DISTRIBUTION/AVAILABILITY STATEMENT STATEMENT A Approved for public release Distribution Unlimited		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This Performance Oriented Packaging (POP) test was conducted to ascertain whether the Shipping and Storage Container for the Mk 14 Mod 0 Explosive Section meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was one inert Mk 14 Mod 0 Explosive Section weighing 52.2 kg (115 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 5.4 kg (12 pounds) were added. Gross weight of the loaded container was 72.1 kg (159 pounds). The test results indicate that the container has conformed to the POP requirements. 92 1 037			
14. SUBJECT TERMS POP Test of Shipping and Storage Container for the Mk 14 Mod 0 Explosive Section		15. NUMBER OF PAGES 7	
16. PRICE CODE		17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	
18. SECURITY CLASSIFICATION OF THIS PAGE UL		19. SECURITY CLASSIFICATION OF ABSTRACT UL	
20. LIMITATION OF ABSTRACT UL			

DODPOPHM/USA/DOD/NADTR92026

**PERFORMANCE ORIENTED PACKAGING TESTING
OF CONTAINER, SHIPPING AND STORAGE,
FOR THE MK 14 MOD 0 EXPLOSIVE SECTION
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS**

Author:
Dennis M. Kotun
Mechanical Engineering Technician

Performing Activity:
Naval Weapons Station Earle
Colts Neck, New Jersey 07722-5000

October 1992

FINAL

DISTRIBUTION UNLIMITED

Sponsoring Organization:
Naval Mine Warfare Engineering Activity
Port Hueneme Division (Code 7310)
Naval Surface Warfare Center
Yorktown, VA 23691-5076

Accession For

NTIS ORNL ☒

DTIC TAB ☐

Unannounced ☐

Justification

By

Distribution/

Availability Codes

Dist	Avail and/or Special
A-1	

INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the Shipping and Storage Container for the Mk 14 Mod 0 Explosive Section meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was one inert Mk 14 Mod 0 Explosive Section weighing 52.2 kg (115 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 5.4 kg (12 pounds) were added. Gross weight of the loaded container was 72.1 kg (159 pounds).

Due to unavailability only one container was used for testing. This is less than the number required by the regulations. Approval for this deviation has been granted by the Under Secretary of Defense, Memorandum for the Joint Logistics Commanders dated 22 February 1990.

TESTS PERFORMED

1. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.608. The container was placed on a repetitive shock platform which has a vertical linear motion of 1-inch double amplitude. Movement of the container was restricted during vibration in all but the vertical direction. The frequency of the platform was increased until the container left the platform 1/16 of an inch at some instant during each cycle. Test time was 1 hour.

2. Stacking Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.606. The container was subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a minimum height of 3 meters (including the test container). A weight of 288.5 kg (636 pounds) was stacked on the test container. The test was performed for 24 hours. The weight was then removed and the container examined.

3. Drop Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.603. Six drops were performed from a height of 1.2 meters (4 feet) in the following orientations (three drops for each orientation):

- a. Horizontally.
- b. Diagonally on the edge between the cover assembly and the top ring of the container.

PASS/FAIL

1. Base Level Vibration Test

The criteria for passing the base level vibration test is outlined in Title 49 CFR, Sec. 178.608(c): No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength.

2. Stacking Test

The criteria for passing the stacking test is outlined in Title 49 CFR, Sec. 178.606(d): No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation.

3. Drop Test

The criteria for passing the drop test is outlined in Title 49 CFR, Sec. 178.603(f): A package is considered to successfully pass the drop tests if for each sample tested, no rupture occurs which would permit spillage of loose explosive substances or articles from the outer packaging.

TEST RESULTS

1. Base Level Vibration Test

Satisfactory.

2. Stacking Test

Satisfactory.

3. Drop Test

Satisfactory.

DISCUSSION

1. Base Level Vibration Test

The input vibration frequency was 3.4 Hz. Immediately after the vibration test was completed, the container was removed from the platform, turned on its side and inspected. No unfavorable distortion or deterioration was observed.

2. Stacking Test

The container was inspected after the 24-hour period was over. No unfavorable distortion or deterioration was observed.

3. Drop Test

After each drop, the container was inspected. The inert Mk 14 Mod 0 Explosive Section was completely retained by the container.

REFERENCE MATERIAL

A. Code of Federal Regulations, Title 49 CFR, Parts 107-178.

B. Bureau of Explosives Tariff No. BOE 6000K Hazardous Materials Regulations of the Department of Transportation by Air, Rail, Highway, Water including Specifications for Shipping Containers.

DISTRIBUTION LIST

Defense Technical Information Center (2 copies)
ATTN: DTIC/FDA
Bldg. 5, Cameron Station
Alexandria, VA 22304-6145

Defense General Supply Center
ATTN: DDRV-TMPA, D. Gay
Richmond, VA 23219

Commander
Naval Surface Warfare Center
ATTN: Crane Division (Code 4053)
Crane, IN 47522-5000

TEST DATA SHEET

POP MARKING:	
UN 1A2/Y73/S/**/USA/DOD/NAD	
**YEAR LAST PACKED OR MANUFACTURED	
Container: Shipping and Storage Container for the Mk 14 Mod 0 Explosive Section	
Type: 1A2	Container P/N or NSN: P/N 5468241
Drawing Number: 5468241	Outer Packaging Material: Steel
Dimensions: 27-15/32" H x 14-9/16" dia	Gross Weight: 72.1 kg (159 pounds)
Closure (Method/Type): Removable Cover w/Locking Ring	Tare Weight: 14.5 g (32 pounds)
Additional Description:	
PACKAGED COMMODITY:	
Name: See table 1	NSN(s): See table 1
United Nations Number: See table 1	
United Nations Packing Group: II	
Physical State (Solid, Liquid, or Gas): Solid	
Vapor Pressure (Liquids Only): N/A At 50 °C: N/A At 55 °C: N/A	
Consistency/Viscosity: N/A	Density/Specific Gravity: N/A
Amount Per Container: See table 1	Flash Point: N/A
Net Weight: See table 1	
PACKAGED COMMODITY USED FOR TEST:	
Name: Mk 14 Mod 0 Explosive Section	Physical State: Solid
Consistency: N/A	Density/Specific Gravity: N/A
Test Pressure (Liquids Only): N/A	Net Weight: 57.6 kg (127 pounds)
Additional Description:	
The net weight includes the current maximum commodity weight plus an additional 5.4 kg (12 pounds).	

N/A = Not Applicable

TABLE 1
Commodities Approved for Shipping in the
Shipping and Storage Container for the Mk 14 Mod 0 Explosive Section

NALC/ DODIC	NSN	Commodity Nomenclature	Packing Drawing Number	Haz Class/Div	UN Number	Units/ Cntr	Total Net Weight (lb)	Total Gross Weight (lb)
2W40	1351-01-231-7077	Explosive Section, Mk 14 Mod 0	5468241	1.1D	UN0137	1	115	147